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The effects of action, normality, and decision carefulness on anticipated regret: Evidence for a broad mediating role of decision justifiability

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Two distinct theoretical views explain the effects of action/inaction and social normality on anticipated regret. Norm theory (Kahneman & Miller, 1986) emphasises the role of decision mutability, the ease with which one can imagine having made a different choice. Decision justification theory (Connolly & Zeelenberg, 2002) highlights the role of decision justifiability, the perception that the choice was made on a defensible basis, supported by convincing arguments or using a thoughtful, comprehensive decision process. The present paper tests several contrasting predictions from the two theoretical approaches in a series of four studies. Study 1 replicated earlier findings showing greater anticipated regret when the chosen option was abnormal than when it was normal, and perceived justifiability mediated the effect. Study 2 showed that anticipated regret was higher for careless than for careful decisions. Study 3 replicated this finding for a sample holding a different social norm towards the focal decision. Finally, Study 4 found that, when decision carefulness, normality and action/inaction were all specified, only the former showed a significant effect on anticipated regret, and the effect was again mediated by perceived justifiability. Decision justification theory thus appears to provide a better account of anticipated regret intensity in this context than does norm theory.

Keywords: Anticipated regret; Decision process carefulness; Justifiability; Normality; Regret aversion.

Recent research attests to the important role of anticipated emotions in decision making. One anticipated emotion that has received particular attention is anticipated regret (Zeelenberg & Pieters, 2007). Numerous studies have shown that individuals make decisions so as to avoid anticipated future regret. Regret avoidance has been found in practical domains such as negotiation (Larrick & Boles, 1995), consumer behaviour (Simonson, 1992), sexual behaviour (Richard, van der Pligt, & de Vries, 1996), and health decisions (Chapman & Coups, 2006), as well as in simple laboratory gambling tasks (Reb & Connolly, 2009). While it seems clear that anticipated regret

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influences choices, much less research has examined the antecedents of anticipated regret. Why is it that decision makers anticipate more intense regret for some ways of making a decision than for others? Recent research (e.g., Connolly & Zeelenberg, 2002; Pieters & Zeelenberg, 2005) has started to examine the role of decision justifiability in the experience of regret. The present paper builds on this research. In four experiments, we highlight the importance of decision justifiability in explaining the influence of several antecedent variables on anticipated regret.

Determinants of anticipated regret intensity

Previous research has identified three major factors that affect the intensity of anticipated regret: relative outcome severity, mutability, and justifiability.

Relative outcome severity

The intensity of anticipated regret is influenced by *relative outcome severity*: The worse the expected outcome of a chosen option relative to a foregone option, the greater the anticipated regret (Loomes & Sugden, 1982; Mellers, Schwartz, & Ritov, 1999). Reference points other than foregone outcomes can also affect anticipated regret (e.g., Connolly, Ordóñez, & Coughlan, 1997). The idea makes intuitive sense: Consider your anticipated regret for losing $10,000 versus $100 from investing in the wrong stock. Clearly, we anticipate more intense regret for the larger loss.

Mutability

The intensity of regret is also thought to be influenced by *mutability* (Kahneman & Miller, 1986). In a much-cited paper, Kahneman and Tversky (1982) showed that regret intensity can depend on whether the option chosen involves action or inaction. Holding relative outcome severity constant, they found in a scenario study that people thought an investor who switched stocks (and lost money) would experience more regret than an investor who did not switch stocks (and lost the same amount of money), the so-called *action effect*. Kahneman and Tversky argued that inaction is, in most contexts, the "default option", so that it is easier to imagine, counterfactually, that one had not switched stocks when one actually did than it is to imagine one had switched stocks when one actually did not. Further, they argued that the availability of such upward counterfactual thoughts leads to more intense regret. (For an introduction to the counterfactual thinking literature see, e.g., Mandel, Hilton, & Catellani, 2005; Roese, 1997. For a discussion of its intimate connection with regret research, see Roese, Summerville, & Fessel, 2007).

One account of the action effect is offered by norm theory (Kahneman & Miller, 1986). In norm theory " . . . objects or events generate their own norms by retrieval of similar experiences stored in memory or construction of counterfactual alternatives. The normality of a stimulus is evaluated by comparing it to the norms it evokes after the fact" (Kahneman & Miller, 1986, p. 136). Abnormal actions more easily activate counterfactual thoughts of what could have been, and are thus more "mutable" (i.e., subject to mental revision in thinking about alternatives to what actually happened). As a result, abnormal actions are predicted to lead to more regret about what could have been (and more generally, emotional amplification) than normal actions. The action effect is offered as an example of the process. According to Kahneman and Miller "consequences of actions evoke stronger emotional consequences than consequences of failures to act . . . [because] . . . it is usually easier to imagine oneself abstaining from actions that one has carried out than carrying out actions that were not in fact performed" (1986, p. 145). Note that considerations of decision justifiability play no role in this argument.

Consistent with the mutability account of regret intensity, regret has been found to be judged more intense after action, as compared to inaction (Landman, 1987), and after personally unusual behaviours, as compared to personally normal behaviours (Kahneman & Miller, 1986; Seta, McElroy, & Seta, 2001). However, some research results appear to be inconsistent with the mutability account. For example, N'gbala and

Branscombe (1997) found an action effect only in a within-subjects design, not in a between-subjects design. They argued plausibly that norm theory would have predicted just the opposite. In the within-subjects case, the argument based on the differential availability of counterfactuals is moot because both action (abnormal) and inaction (normal) alternatives are explicitly given to the participants as part of the experimental materials. (It should be noted that Baron & Ritov, 1994, read norm theory as consistent with these data.) Other research has found examples of more intense regret following *in*action rather than action (e.g., Connolly & Reb, 2003; Gilovich & Medvec, 1995).

Perceptions of decision justifiability

Findings such as these, together with theoretical arguments (e.g., Janis & Mann, 1977; Sugden, 1985), have led to the identification of a third potential influence on the intensity of anticipated regret: the *justifiability* of the decision (Connolly & Reb, 2005; Connolly & Zeelenberg, 2002). The notion of justifiability here is essentially the everyday meaning of the word: the perception that one has adequate reasons, evidence, logic or arguments to support the choice one has made or is about to make (see also Nozick, 1993). The same notion is central to older cognitive consistency formulations. For example, in the "insufficient justification paradigm" (Aronson, 1969), discomfort or dissonance was thought to be generated when an individual realised that he or she had engaged in some undesirable act (such as publicly lying) under an inadequate monetary incentive (such as a $1 payment).

Decision justification theory proposes that discomfort in the form of decision-related regret is experienced when one discovers that one's choice has led to an unfortunate outcome. It distinguishes two major components of such regret, one associated with the outcome being (comparatively) poor, the other with inadequacies in the decision itself, or in the process that led up to it. Self-blame is an essential ingredient of this second component of regret. The less justifiable that decision makers perceive a decision to be, the more likely they are to blame themselves, and the more decision regret they will experience if the outcome is bad. To a mother, a child's sickness is regrettable in itself, but the regret is exacerbated if she reflects that the sickness resulted from her careless or unthinking medical decision.

Decision justification theory is concerned with how well-justified decision makers *themselves* perceive a decision to be, the justifications *they themselves* consider reasonable for the way it was made, and the *self*-blame and regret they experience when they do not see the decision as justifiable. A related, but not necessarily identical, notion of justifiability is central to research and theorising on accountability (Lerner & Tetlock, 1999; Tetlock, 1985). Accountability is concerned with people's beliefs about what *others* will perceive as justifying a decision, and with efforts to behave in ways that meet these external standards. Internal and external standards may, of course, coincide, but there is no necessary reason they always will. A mother's decision not to vaccinate her child may have been guided by an intuition, a dream, or the advice of a fortune-teller, and she may feel entirely justified in relying on this guidance. However, she may also realise that such sources of guidance will be unpersuasive to a sceptical audience and therefore make her public account of her decision on entirely different grounds.

Connolly and Zeelenberg (2002) have shown that decision makers' justifiability perceptions can, post hoc, account for a variety of past findings (e.g., Crawford, McConnell, Lewis, & Sherman, 2002; Zeelenberg, van den Bos, van Dijk, & Pieters, 2002). For example, in a consumer preference study (Simonson, 1992), participants primed to think about regret chose the safer option (a reputable, name-brand product) over the riskier option (a cheaper, no-name product) more often than did participants in a control condition. The product's reputation appears to have justified the choice and thus led to lower anticipated regret. In addition to providing post hoc accounts of earlier findings, decision justification theory has also stimulated some new research on the determinants of anticipated and experienced regret (e.g., Inman & Zeelenberg, 2002).

For example, Pieters and Zeelenberg (2005) found in a series of studies that intention–behaviour inconsistency can increase experienced regret over a bad outcome. They also found that self-reported amount of thinking about the decision, an indicator of decision process carefulness, was negatively related to experienced regret. Reb (2008) and Reb and Connolly (2009) demonstrated the reverse effect, that increasing the salience of anticipated regret can lead to more careful, justifiable decision processes.

While these recent empirical findings are suggestive, they have not fully established the role of decision justifiability in anticipated regret, and more generally, the importance of different antecedents of anticipated regret. For example Zeelenberg and Pieters (2007; cf. Pieters & Zeelenberg, 2007) in their recent regret regulation theory emphasised the role of justifiability perceptions (consistent with decision justification theory). Norm theory and decision justification theory offer theoretical accounts of the determinants of anticipated regret that, while not mutually inconsistent, emphasise distinctly different causal factors and draw on distinct bodies of evidence. In this paper we examine the predictive power of both justifiability and normality in a series of experiments within a single empirical framework. In Study 1 we revisit earlier findings on the relationship among normality, action and anticipated regret, and show that a justifiability account provides a more parsimonious, and in some ways stronger, interpretation of the data than does norm theory, the original interpretation. In Study 2 we show that decision carefulness, a common decision justification, does indeed ameliorate regret. Study 3 replicates this result in a participant sample holding different social norms concerning the focal decision than that in Study 2. Finally in Study 4 we examine the joint effect of normality, action/inaction and decision carefulness on anticipated regret, and show that the impact of normality is eliminated once carefulness is specified. Across all studies, we find evidence of the central role of decision justifiability. The conclusion argues that decision justification theory attracts sufficient support in these data that it must be considered at least as an adjunct to norm theory as an account of anticipated regret in decision making.

STUDY 1

Several studies have shown that the normality, or typicality, of a choice can affect anticipated regret. Abnormal choices such as unusual actions and personally abnormal behaviours lead to more intense anticipated regret than do normal ones (Kahneman & Miller, 1986; Kahneman & Tversky, 1982; Landman, 1987; Seta et al., 2001). As noted earlier the standard account, based on norm theory (Kahneman & Miller, 1986), argues that the effect is due to the easier mutability of abnormal choices, which leads to easier availability of counterfactuals and thus to more intense regret. N'gbala and Branscombe's (1997) results challenge this account. The alternative that we examine here proposes that normal choices lead to less anticipated regret because they are perceived as more justifiable than abnormal choices.

We chose a decision context that has been used in numerous earlier studies: a parent's decision whether or not to vaccinate her or his child (e.g., Connolly & Reb, 2003; Ritov & Baron, 1990).[1] In this scenario, a decision to vaccinate means taking action, not vaccinating means inaction. Vaccination is preferred by the majority of the US

[1] Anticipated regret rated for scenarios such as the one we used has been found to predict real choices. Wroe, Turner, and Salkovskis (2004) compared different potential predictors of actual immunisation decisions and found that "anticipated regret ... was the strongest predictor of likelihood of immunizing the child" (p. 38), predicting 57% of the variance (demographic variables, in contrast, predicted only 1% of the variance). The vaccination decision has also been the context of a number of studies examining a possible omission bias, a tendency to prefer inaction over action, in health-related decisions, a bias possibly resulting from increased anticipated regret for action (e.g., Ritov & Baron, 1990). We are not concerned here with the debate about the existence of this bias (the interested reader can refer to the papers cited above as well as Connolly & Reb, 2003, and Baron & Ritov, 2004).

population (Connolly & Reb, 2003), so we expected higher anticipated regret for inaction (not vaccinating) than for action (vaccinating)—that is, an *in*action effect. More importantly, we expected that perceived decision justifiability would predict anticipated regret and that any effect of the action/inaction manipulation would be partially mediated by differences in the perceived justifiability of vaccinating and not vaccinating.

We also manipulated whether or not the protagonist in the scenario decides to do what her friends and family do. This manipulation of social normality was implemented both within- and between-subjects. A decision that conforms to what one's friends and family do (i.e., a socially normal decision) may not be seen as justifiable (and, therefore, as leading to reduced anticipated regret) when evaluated in isolation. However, when it is explicitly contrasted with a socially abnormal decision leading to the same outcome, decision makers may perceive the socially normal choice as more justifiable (and, therefore, less regrettable). We therefore expected to find an effect of social normality on anticipated regret within-subjects, but not for the between-subjects contrast.[2] We again expected perceptions of the justifiability to partially mediate any effect (between- *and* within-subjects) of social normality on anticipated regret.

Method

Design and procedure

Participants read a scenario in which two mothers each face the decision whether or not to vaccinate their small child against a threatening flu. Both make the same choice: either both vaccinate, or both do not. For one mother the choice is described as consistent with what most of her family and friends did when faced with a similar decision (i.e., a socially normal choice). For the other, her choice is described as inconsistent with that of family and friends (i.e., a socially abnormal choice). In all conditions the choice results in the same poor outcome, a sick child. Thus, the experiment manipulated two factors each with two levels: action (vaccinate vs. don't vaccinate) and social normality (socially normal vs. socially abnormal decision). Action was manipulated between-subjects only, whereas social normality was manipulated both between- and within-subjects, as described below.

The experimental materials were presented in a multi-page questionnaire. The basic decision situation faced by the two mothers was described on the first page. On the second page participants read about the decision of the first mother (whether she vaccinated or not, and whether this was, for her, socially normal or not), and the result (the child's sickness). They then rated how much regret they thought the mother would feel over her decision. On the next page, participants read about the decision of the second mother, which differed from the first only in that the social normality of her choice was opposite that of the first mother. They then rated the intensity of the second mother's regret, as before. Order of presentation of the two decisions was counterbalanced. On the final page, respondents rated several statements concerning the normality and justifiability of the decisions.

Participants

Seventy-six undergraduate students at a large university in the southwest US participated for extra course credit. They took about ten minutes to complete the questionnaire. Though this population, of course, has little or no experience of making vaccination decisions for babies, we found in an earlier study (Connolly & Reb, 2003) that their responses to this scenario were very similar to those of a sample of the general adult population.

[2] We manipulated action only between-subjects because, based on previous findings showing a preference for, and general acceptance of, vaccination as the typical choice in the population (Connolly & Reb, 2003) we felt confident that the action/inaction manipulation would affect anticipated regret (and perceived justifiability) in a between-subjects design.

Materials, manipulations, and measures

Scenario. The scenario, slightly adapted from Connolly and Reb (2003), explained that the risk of an unvaccinated child getting the flu was about equal to the risk of a vaccinated child experiencing vaccine side-effects, and that flu and vaccine side-effects were equally serious: the child "was very sick and unhappy for almost three weeks". The outcomes and risks of the active and inactive options were thus essentially equal.[3] The manipulations of action and social normality were implemented as follows (different conditions in brackets):

[Protagonist] decides [not] to vaccinate her child, [like most of the people she knows/although most of the people she knows decide [not] to vaccinate their children]. Unfortunately, her child [gets a severe case of the flu/experiences the severe side-effects of the vaccine] and is very sick and unhappy for almost three weeks.

Anticipated regret. After reading about one mother's decision and its outcome, participants were asked to imagine themselves in the protagonist's situation and to indicate how they would feel. Anticipated regret intensity was measured on an 11-point scale ($0 = I$ *wouldn't experience this at all*; $10 = I$ *would experience this a lot*). This measure was embedded in a list of several other emotions to avoid demand effects. Participants then read about the other mother's decision and its consequences, and completed the same emotion ratings.

Perceived decision justifiability. After completing the emotion ratings for both scenarios, participants rated several items concerning the decisions of the two protagonists on 5-point Likert-scales (anchored at "*strongly agree*" and "*strongly disagree*", coded as $+2$ and -2, respectively). Decision ratings were on a separate page to reduce possible demand effects when indicating anticipated regret. Two pairs of items measured perceptions of decision justifiability for each protagonist: "[Protagonist] made a good choice", and "[Protagonist] made a justifiable decision". The items were averaged into justifiability indexes (average Cronbach's $\alpha = .73$). In addition, as a manipulation check a pair of items asked about the social normality of the decision of each protagonist ("[Protagonist] chose the same alternative as most people she knows").

Results

Manipulation check

A between-subjects analysis of variance (ANOVA) on social normality ratings found the expected main effect of the manipulation (socially normal $M = 1.47$, socially abnormal $M = -1.23$), $F(1, 72) = 92.09$, $p < .001$. The same main effect was also revealed in a mixed-model ANOVA, $F(1, 73) = 139.70$, $p < .001$. No other effects (of action, order, and interactions) on rated social normality were significant, all ps $> .1$.

Experimental effects on anticipated regret

Action. We first analysed only the responses to the first decision in a between-subjects ANOVA with action and social normality as between-subjects factors. This analysis revealed a significant main effect for Action, $F(1, 72) = 5.24$, $p < .05$, $\eta_p^2 = .07$. As expected, a bad outcome resulting from vaccination (action) was expected to be less regrettable ($M = 6.76$, $SD = 3.33$) than one resulting from non-vaccination (inaction; $M = 8.18$, $SD = 1.73$). This effect was replicated in a mixed-model ANOVA on the full data set (i.e., including responses to the decisions of both protagonists) with social normality as within-, and action and order as between-subjects factors, $F(1, 72) = 6.64$, $p < .05$, $\eta_p^2 = .08$ (Ms $= 6.58$ and 8.15). The order effect and all interactions were non-significant, all ps $> .1$.

[3] Connolly and Reb (2003) provide evidence that participants find this a comprehensible scenario and are able to construct plausible explanations for the decisions they would make. Interestingly, a preference for action or inaction per se is very rarely mentioned in these explanations.

Social normality. A between-subjects ANOVA considering only the first decisions showed no significant difference between-subjects in anticipated regret intensity between socially normal ($M = 7.50$, $SD = 2.30$) and socially abnormal ($M = 7.48$, $SD = 3.06$) decisions, $F(1, 72) = 0.00$, *ns*, $\eta_p^2 = .000$. However, the mixed-model ANOVA revealed a significant within-subjects effect of Social Normality, $F(1, 72) = 10.03$, $p < .01$, $\eta_p^2 = .12$. When normal and abnormal choices were explicitly compared, the socially normal choice was considered less regrettable ($M = 7.09$) than the socially abnormal choice ($M = 7.68$). Thus, the manipulation of social normality had a significant influence only when highlighted in a within-subjects design.

The role of perceived decision justifiability

We conducted several analyses to examine whether perceived justifiability explained the observed anticipated regret ratings. We first examined whether justifiability perceptions mediated the between-subjects effect of action on anticipated regret, following the Baron and Kenny (1986) procedure. First, consistent with the justifiability account, the more a decision was perceived as justifiable, the less regrettable it was anticipated to be in the event of a bad outcome, $\beta = -.37$, $t = 3.46$, $p < .01$. Second, action affected perceived justifiability as expected such that a decision to vaccinate was perceived as more justifiable ($M = 0.57$) than a decision not to vaccinate ($M = -0.03$), $F(1, 72) = 5.37$, $p < .05$, $\eta_p^2 = .07$. Third, when regressing anticipated regret on both action and perceived justifiability, the effect of action became just significant ($\beta = .18$, $t = 1.67$, $p = .05$, one-tailed), and perceived justifiability remained a significant predictor ($\beta = -.33$, $t = 2.99$, $p < .01$). A Sobel (1982) test for mediation was significant ($z = 1.83$, $p < .05$, one-tailed). These analyses suggest that perceived justifiability partially mediated the effect of action on anticipated regret.

We next examined whether justifiability perceptions also mediated the within-subjects effect of social normality on anticipated regret. First, we found in two linear regression analyses that a more justifiable decision was expected to be less regrettable in both the socially normal condition ($\beta = -.37$, $t = 3.50$, $p < .01$) and the socially abnormal condition ($\beta = -.42$, $t = 3.98$, $p < .001$). Second, a socially normal choice was perceived as more justifiable ($M = 0.40$) than a socially abnormal choice ($M = 0.16$), $F(1, 73) = 5.54$, $p < .05$, $\eta_p^2 = .07$.

Mediation of within-subjects effects cannot be tested using the Baron and Kenny (1986) procedure. However, Judd, Kenny, and McClelland (2001) describe a way to test for mediation of within-subjects effects when both the dependent variable and the presumed mediator are measured twice (i.e., once for each within-subjects condition), as in the present case. As Judd et al. have shown, significant mediation is demonstrated when the difference between the two measures of the mediator significantly predicts the difference between the two measures of the dependent variable. A regression with both the sum and the difference in the two mediator measures as predictors of the difference in the dependent variable showed a significant prediction by the difference score ($\beta = .27$, $t = 2.44$, $p = .05$) showing that perceived justifiability mediated the effect of social normality on anticipated regret.[4] Because the intercept in this regression model was significant ($t = 2.66$, $p = .01$) including the centred sum of the two mediator variables, the mediation was partial (see Judd et al.).

Discussion

Study 1 examined the effect of action/inaction and social normality on anticipated regret, and the

[4] Moderation exists when the sum of the repeated mediator measures predicts the difference of the repeated dependent variable measures. While we were not interested in a potential moderating role in the present context, Judd et al. (2001) recommend including both difference and sum predictors in order not to mis-specify the model. We have followed their advice in our analysis and found no significant moderating role of perceived justifiability.

role of perceived decision justifiability in mediating this effect. We found that anticipated regret was affected by the between-subjects action manipulation, with inaction leading to higher anticipated regret, and by the within-subjects social normality manipulation, with socially abnormal choices leading to more intense anticipated regret.

We also found correlational evidence for an important role of justifiability perceptions in determining anticipated regret. First, the more justifiable a decision was perceived to be, the less regrettable it was expected to be in the event of a bad outcome. Second, action and social normality affected perceived decision justifiability and anticipated regret in a consistent direction. Third, mediation analyses found that perceived justifiability mediated both the effect of action and that of social normality on anticipated regret. Finally, highlighting the difference in social normality between the two protagonists by a within-subjects manipulation led to a significant effect of normality on anticipated regret. No such difference was seen in a between-subjects manipulation. This finding seems to run counter to a norm theory account, following N'gbala and Branscombe's (1997) argument reviewed earlier.

In Study 1, the evidence suggesting a key role for justifiability perceptions in determining anticipated regret came from process measures. In Study 2 we explicitly manipulated justifiability as an experimental factor by describing the protagonist's decision process as either conscientious and careful, or as casual and unthinking.

STUDY 2

Previous studies of justification and anticipated regret have examined justifications that are highly context specific: previous experience with a particular product (Inman & Zeelenberg, 2002), the reputation enjoyed by a specific brand (Simonson, 1992), or an individual's entrepreneurial personality (Seta et al., 2001). Study 1 suggested that another consideration, social normality, might serve as a regret-reducing justification. In Study 2 we examine a justification that is potentially relevant to a wide range of choices: the care and thoroughness of the decision process itself. Janis and Mann (1977) suggest that anticipatory regret can motivate what they call a "vigilant decision process". Our question here is whether the use of such a process does, in fact, lead to reduced expectations of regret.[5]

Method

Design and procedure

In Study 2 we manipulated action/inaction between-subjects. Decision process carefulness was manipulated between-subjects across three levels: a careful decision, a careless decision, or a control condition in which no information on the decision process was provided.

Participants

One hundred eighty undergraduate students enrolled in an introductory course in organisational behaviour at a large university in the southwest US participated for extra-credit. They took about 10 minutes to complete the experimental materials.

Materials and measures

We used the same vaccination scenario as in Study 1, with the same action/inaction manipulation and the same negative outcome for the child in all conditions. Decision process carefulness was manipulated as follows. The careful decision process was described as:

[5] We recognise that there is an important and on-going debate on the broad issue of decision quality, coherence, outcome bias, cardinality, etc. We intend no novel contribution to this discussion here. We suggest only that, in a wide range of decision settings, a process described as careful, thorough, and drawing on a range of available information will be perceived as better justified than one that has none of these features. Our participants seem to agree with this judgement.

[Protagonist] talked to several doctors, read medical journals, consulted with family and friends, and thought seriously about what to do.

The careless decision process was described as:

[Protagonist] did not collect any information, did not talk with friends or doctors before she made the decision, and didn't think very seriously about the decision.

No information on the decision process was provided in the control condition.

As in Study 1, anticipated regret was measured immediately after the participant read each scenario, using the same 11-point (0–10) scale as before.

Results and discussion

An ANOVA revealed a significant main effect for Decision Process Carefulness, $F(2, 17) = 11.30$, $p < .001$, $\eta_p^2 = .12$. As expected, anticipated regret intensity was lower for a careful decision process ($M = 5.64$, $SD = 3.01$) than for a careless process ($M = 7.67$, $SD = 2.57$), $p < .001$. Pairwise comparisons showed that anticipated regret in the control condition ($M = 7.56$, $SD = 2.49$) was significantly different from (and higher than) the careful condition, $p = .001$, but not from the careless condition, $p = .81$. Whether the decision was to vaccinate or not (action/inaction) did not affect anticipated regret, $F(1, 174) = 0.47$, *ns*, $\eta_p^2 = .003$, and the Carefulness × Action interaction was not significant, $F(2, 174) = 0.81$, *ns*, $\eta_p^2 = .01$.

As predicted, a bad outcome following a justifiable, careful decision process was expected to lead to less intense regret than an equally bad outcome following a careless decision process. These results are consistent with decision justification theory and provide further evidence for the important role of perceived justifiability in determining anticipated regret. The pattern of means suggests that anticipated regret was significantly reduced by using a careful decision process, but not significantly increased by using a careless process, as compared to the control (no process information) condition.

In contrast to Study 1, whether the decision was to act or not did not affect anticipated regret. A possible explanation for this lack of an effect is that different justifications are not simply additive in their effects. In the presence of a strong justification, the influence of weaker justifications may be reduced or eliminated. As we argued earlier, the carefulness of the decision process is likely a strong justification of a choice. When a person makes a choice after collecting a lot of information and deliberating carefully, either choice (i.e., vaccinating and not vaccinating) may seem justified, so that the effect of action/inaction disappears. However, in the absence of this process information vaccinating might appear more justified as it reflects the majority choice. If this is correct then the effect of action should not have been crowded out in the control condition, in which no information on the decision process carefulness was given. The results show that the difference in anticipated regret between action ($M = 6.93$, $SD = 2.87$) and inaction ($M = 8.12$, $SD = 2.03$) in the control condition was substantial (diff = 1.19) and much larger than in the careful process condition (diff = 0.04, action, $M = 5.62$, inaction, $M = 5.66$, $p = .96$, $\eta_p^2 = .000$) or the careless process condition (diff = 0.31, action, $M = 7.82$, inaction, $M = 7.51$, $p = .82$, $\eta_p^2 = .003$). Although the effect failed to reach significance, $F(1, 30) = 1.86$, $p = .18$, possibly due to the small sample size, the effect size, $\eta_p^2 = .06$, is comparable to that of the action manipulation in Study 1, $\eta_p^2 = .07$.

The results suggest a possible contest between alternative justifications, in which a moderate preference for vaccination (the US norm: see Connolly & Reb, 2003) is pitted against a general approval of careful decision processes. This implies that, in a more strongly pro-vaccination sample, the action/inaction effect should be apparent even in the presence of decision process carefulness information. Study 3 tested this idea using a sample from a population with strong pro-vaccination norms. It also provided an independent test of decision process carefulness as a regret-reducing justification.

STUDY 3

Method

Design and procedure

Study 3 used the same design and procedure as Study 2 except that decision process carefulness was manipulated across only two levels: the process was either careful or careless.

Participants

The study was conducted in Singapore, a society with strong pro-vaccination norms and attitudes, and vaccination rates even higher than those in the US and in excess of 96% (World Health Organization, 2006). Participants were 190 undergraduate students taking an introductory course in organisational behaviour at a local university. They thus closely match the sample in Study 2 for age and interests, except for the country from which the sample was drawn.

Results and discussion

Experimental effects on anticipated regret

An ANOVA again revealed a significant main effect for decision process carefulness, $F(1, 186) = 6.10$, $p = .01$, $\eta_p^2 = .03$. Anticipated regret was lower when the bad outcome followed a justifiable, careful decision process ($M = 7.03$, $SD = 2.72$) than when it followed a careless process ($M = 8.08$, $SD = 2.60$). In addition, we now found a significant effect of action, $F(1, 186) = 8.81$, $p < .01$, $\eta_p^2 = .05$. As expected, vaccinating ($M = 6.92$, $SD = 2.99$) was anticipated to lead to less regret than not vaccinating ($M = 8.15$, $SD = 2.24$). The carefulness × action interaction was not significant, $F(1, 186) = 0.54$, *ns*, $\eta_p^2 = .003$.

Comparison of Study 2 and Study 3 samples

If our multiple-justifications argument is correct, pooling Study 2 and Study 3 samples should show a significant interaction between sample (US vs. Singapore) and action, such that the effect of action is stronger in the Study 3 sample than the Study 2 sample. Consistent with this prediction, an ANOVA with Sample (US vs. Singapore), action/inaction, and Decision Process Carefulness (careful vs. careless) as factors revealed a significant interaction between Sample and Action, $F(1, 330) = 4.51$, $p < .05$, $\eta_p^2 = .01$. The interaction is such that Inaction (non-vaccination) increased anticipated regret in the Singaporean sample, but not in the US sample (see detailed results described above).

The findings from Study 3 add further evidence of the role of justifiability in anticipated regret. First, in independent samples drawn from two substantially different populations (US and Singaporean students), decision process carefulness predicted anticipated regret. Second, the data also suggest a possible process by which two justifications interact. When a strong justification (careful process) and a weak justification (vaccination, for the US sample) combine, the second effect is suppressed, and the action/inaction effect disappears. When the same strong justification combines with a second strong justification (vaccination, for the Singapore sample), both effects remain.

STUDY 4

Study 1 showed that anticipated regret is reduced if the precipitating behaviour is socially normal, but the effect appears to be mediated by perceptions of decision justifiability rather than by the mutability mechanism proposed by norm theory. Study 2 showed that decision carefulness, a decision justification, serves a similar regret-reducing role. Study 3 replicates this result, and also suggests a possible combining rule: Two strong justifications show additive effects, while a weak justification may be overwhelmed when it is combined with a strong one. What, then, is the effect on anticipated regret of providing information on both decision process carefulness and decision normality? Study 4 examines the joint effect of the variables examined in Studies 1–3 by manipulating decision process carefulness, social normality, and action/inaction within one experiment. The strong prediction is that of the three factors, only the justification manipulation

(decision carefulness) will show a significant effect on anticipated regret, and that this effect will be mediated by perceived decision justifiability.

Method

Design and procedure

Participants read about a protagonist who either vaccinated her child or not, a choice that either did or did not conform with the choice made by her social peers, and after engaging in either a careful or a careless decision process. Thus, we manipulated between-subjects three factors each with two levels: action/inaction, social normality, and decision process carefulness.

Participants

One hundred sixty-six undergraduate students at a large south-western university in the US participated for extra credit. They took about ten minutes to complete the questionnaire.

Materials and measures

The materials and measures were identical to those of Study 1 except for the three manipulations described above. The relevant paragraph of the scenario in the careful/socially normal/action condition read as follows:

[Protagonist] gives the matter a lot of thought, consults several doctors and medical journals, and talks to her family and friends. Finally, she decides to vaccinate her child, like most of the people she knows. Unfortunately, her child experiences the severe side-effects of the vaccine and is very sick and unhappy for almost three weeks.

In the careless/socially abnormal/inaction condition this paragraph read:

[Protagonist] doesn't give the matter much thought, nor does she discuss it with her doctor, her family or her friends. She just decides not to vaccinate her child, although most of the people she knows decide to vaccinate their children. Unfortunately, her child gets a severe case of the flu and is very sick and unhappy for almost three weeks.

The remaining six conditions were constructed by appropriate combinations of the three experimental factors.

Anticipated regret was measured as in the previous studies. Perceived decision justifiability was measured with the same two items as in Study 1. Manipulation checks asked about the carefulness of the decision process ("[Protagonist] followed a careful decision process") and the social normality of the decision ("[Protagonist] chose the same alternative as most people she knows") using the same 5-point Likert scale response format as in Study 1.

Results

Manipulation checks

Perceptions of decision process carefulness showed the expected main effect for the decision process carefulness manipulation, $F(1, 158) = 254.41$, $p < .001$ (careful $M = 1.51$, careless $M = -1.33$); no other main effect or interaction on perceptions of decision process carefulness was significant, all ps $> .1$. Perceived social normality showed the expected main effect of the social normality manipulation, $F(1, 158) = 127.14$, $p < .001$ (socially normal $M = 0.99$, socially abnormal $M = -1.24$); no other main effect or interaction on perceived social normality was significant, all ps $> .1$.

Experimental effects on anticipated regret

An ANOVA showed that anticipated regret was lower for a careful decision process ($M = 6.49$, $SD = 3.36$) than for a careless process ($M = 7.52$, $SD = 2.81$), $F(1, 158) = 4.58$, $p < .05$, $\eta_p^2 = .03$. The effect for action was non-significant, $F(1, 158) = 0.97$, *ns*, $\eta_p^2 = .01$ (action $M = 6.78$, $SD = 3.08$, inaction $M = 7.25$, $SD = 3.15$). The effect for social normality was also non-significant, $F(1, 158) = 1.11$, *ns*, $\eta_p^2 = .01$ (socially normal $M = 7.29$, $SD = 3.07$, socially abnormal $M = 6.65$, $SD = 3.16$), as were all of the interaction terms, all ps $> .1$.

The role of perceived decision justifiability

As predicted, the more justifiable a decision, the less regrettable a subsequent bad outcome was

expected to be, $\beta = -.46$, $t = 6.55$, $p < .001$. Further, a more careful process was perceived as more justifiable ($\beta = .59$, $t = 9.39$, $p < .001$). Finally, when entered simultaneously both perceived justifiability ($\beta = -.55$, $t = 6.64$, $p < .001$) and perceived decision process carefulness ($\beta = -.16$, $t = 1.88$, $p < .05$, one-tailed) remained significant predictors of anticipated regret. A Sobel test for mediation was significant, $z = 5.32$, $p < .001$, suggesting that perceived justifiability partially mediated the effect of decision process carefulness on anticipated regret.

Discussion

In Study 4 we manipulated decision process carefulness, action, and social normality. We found that a bad outcome following a careful decision process was expected to be less regrettable than the same outcome following a careless process even when information about action and social normality was provided. Justifiability perceptions were higher for a more careful decision process, and were negatively correlated with anticipated regret. As in Study 1, perceived justifiability partially mediated the experimental effect, this time of process carefulness on anticipated regret.

Neither action nor social normality showed a significant effect on anticipated regret. This finding is consistent with our suggestion that when a weak justification (social normality, action) is accompanied by a strong justification (careful process), it is only the strong justification that significantly influences anticipated regret through the process of higher perceived justifiability.

GENERAL DISCUSSION

This research examined the role of justifiability in anticipated regret. In four scenario studies involving a vaccination decision (cf. Connolly & Reb, 2003), we examined the effects on participants' anticipated regret of three variables: action/inaction (i.e., whether the decision was to act or not); social normality (i.e., whether or not the decision conformed to the choices of one's family and friends); and decision process carefulness (i.e., whether or not the decision process was careful). Participants assessed their anticipated regret and, in Studies 1 and 4, the perceived decision justifiability in the event of the child becoming sick, either from the disease itself or from vaccination side-effects.

Results from all four studies suggest that decision justifiability plays an important role in determining anticipated regret intensity. This extends, and partly conflicts with, past research and theorising that has suggested that the normality, or typicality, of a decision affects (anticipated) regret through the easier counterfactual mutability of abnormal choices (Kahneman & Miller, 1986; Kahneman & Tversky, 1982). Study 1 showed that the effects of action and social normality on anticipated regret, previously explained through mutability, can be parsimoniously explained to a substantial degree by perceived decision justifiability. As in earlier studies in the vaccination context (see Connolly & Reb, 2003) we did not find the so-called "action effect" predicted by norm theory. Our results suggest instead that whether action or inaction leads to more regret depends on a person's assessment of the justifiability of the option chosen rather than on whether it involved action or inaction per se (cf. Zeelenberg & Pieters, 2007). Consistent with this argument, the effect of action was mediated through perceptions of decision justifiability.

The effect of social normality on anticipated regret was also mediated through perceived decision justifiability. Interestingly, we found that social normality affected anticipated regret only when the manipulation was made salient in a within-subjects manipulation. Apparently, in a within-subjects design, the differential justifiability of normal and abnormal behaviour became more salient, leading to a stronger effect on anticipated regret. The finding is inconsistent with norm theory (cf. N'gbala & Branscombe, 1997).

Further highlighting the role of decision justifiability, we found (Studies 2 & 3) that a

careful decision process is expected to protect decision makers to some extent from regret following a bad outcome. These results were duplicated both in a moderately pro-vaccination Western (US) sample (Study 2) and in a strongly pro-vaccination (Singapore) sample (Study 3), suggesting that a careful decision process may be seen quite broadly as decision justifying, and regret reducing. Finally, the effect of decision justifiability on anticipated regret was apparent even in Study 4, where social normality, action/inaction, and decision process carefulness were manipulated in a full factorial design. When all three factors were specified, only decision process carefulness showed a significant effect, and this effect was partially mediated through perceived decision justifiability.

Pieters and Zeelenberg (2005) have shown that the justifiability of a decision (as indicated by the degree of intention–behaviour consistency and amount of thinking preceding choice) can affect not only the anticipation but the actual experience of post-decisional regret. This consistency between anticipated and experienced regret is especially interesting given other research suggesting a discrepancy between anticipated and experienced regret, resulting in mispredictions of regret (e.g., Gilbert, Morewedge, Risen, & Wilson, 2004; Sevdalis & Harvey, 2007). Our results, together with Pieters and Zeelenberg's findings, suggest that decision makers may be correct to predict that making a justifiable decision will protect them to some degree from post-decisional regret. Future research is needed to clarify the conditions under which anticipated and experienced regret correspond or diverge.

All four of the studies reported here showed an important role for decision justifiability in determining the intensity of anticipated regret. However, it should be noted that, even when anticipated regret was reduced by strong justifiability, the mean score remained around the midpoint of the scale. Consistent with decision justification theory's (Connolly & Zeelenberg, 2002) two-component model of (anticipated) regret, substantial outcome regret (over the child's sickness) remains even if the self-blame component of regret associated with lack of decision justification is eliminated.

The findings hint at the complexities of combining multiple sources of justification. In our moderately pro-vaccination US samples, we found no significant main effects on anticipated regret of either action or of social normality when decision process carefulness information was given (Studies 2 and 4). However, in a sample with strong pro-vaccination attitudes (Study 3) the influence of action remained significant (vaccinating expected to lead to lower regret) even in the presence of decision process carefulness information. Future research needs to examine in more detail the conditions under which different justifications interact.

Limitations and future research

Several limitations of our studies point to directions for future research. First, Janis and Mann (1977) predicted that anticipation of regret leads to more "vigilant" decision making. Consistent with this prediction we have shown that people anticipate more regret when a poor outcome follows a careless decision process than a careful one. However, we did not demonstrate that decision makers will actually improve their decision processes to avoid this anticipated regret. However, recent studies (Reb, 2008; Reb & Connolly, 2009) suggest that this may be the case. Future research should examine in detail whether regret aversion, either experimentally induced or measured as an individual difference variable, leads to more vigilant, careful decision making.

It is, perhaps, worth reiterating that in none of these experiments did we directly manipulate perceived justifiability. We experimentally manipulated factors (social normality, decision carefulness, action/inaction) that we expected to affect both justifiability perceptions and anticipated regret. In Studies 1 and 4 we then used statistical mediation analyses to show the important role of perceived justifiability in the experimental effects. Such analyses can provide valuable information about the psychological processes through which

experimental manipulations affect dependent variables (Baron & Kenny, 1986). However, they are not without shortcomings (Spencer, Zanna, & Fong, 2005). In particular, mediation analyses are correlational in nature and, as such, do not allow for strong causal inferences. All we can say is that the results of the statistical mediation analyses are consistent with our theoretical account.

Two further limitations of our study were (a) the use of a hypothetical scenario methodology with student participants, and (b) the use of only one decision context. The first critique is somewhat blunted by the consideration that participants' anticipations of how they would feel in some imagined situation is the substantive variable of interest, not merely a pallid substitute for the real experience of that emotion. Also, past research found that student participants gave very similar responses to the vaccination scenario as did a general adult sample (Connolly & Reb, 2003). We are also encouraged by the findings of Wroe et al. (2004), noted earlier, showing that anticipated regret does strongly predict actual vaccination choices. However, extension of the present studies to real decision makers and real decisions is an obvious priority, as is extension to a wider range of decision contexts. In addition, future research could contribute by using some alternative methods, such as recall of actual experiences of (anticipated) regret or experience sampling of (anticipated) regret.

A final direction for future research will be to examine individual differences in the anticipation of regret. Such research could draw on work by Schwartz and colleagues (2002) on the difference between maximisers (who tend to experience more regret) and satisficers. For example, maximisers may anticipate more regret for careless decisions than do satisficers and set higher standards for what is a justifiable decision. Other plausible individual difference variables to examine could be decision makers' neuroticism or self-esteem.

Conclusion

This paper examined the effects of normality, action/inaction and decision process carefulness on anticipated regret, and the role of decision justifiability in these effects. We found support for the central prediction of decision justification theory (Connolly & Zeelenberg, 2002) that anticipated regret is reduced when a decision is perceived as justifiable. Overall, our results support decision justification theory's account of decision makers' regret anticipations. The suggestion is that the mechanism underlying the normality effect may be one of justification rather than the counterfactual/mutability account norm theory proposes.

The results also suggest a positive view of the role of regret in decision making. Earlier research on the so-called action effect suggested that anticipated regret might be a biasing factor, leading to a preference for inaction even when the active option was objectively superior. The current research suggests, instead, that anticipated regret can have a beneficial effect on decision making, by stimulating search for more justifiable decisions, and thus encouraging more careful decision processes.

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